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NC 82,637

3/11/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re : Chow et al
Serial No.: 09/964,544
Filed: Sept. 28,2001
Title: Nanosize Particle
Coatings Made By
Thermally Spraying
Solution Precursor
Feedstocks

Examiner: Jason Savage
Group Art Unit: 1775

February 26, 2003

Appeal Brief

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

This is an appeal from the final rejection dated October 3, 2002, finally rejecting claims 19-25. No claims have been allowed in this application.

(1) Real Party in Interest

The real party in interest herein is the U.S. Navy.

(2) Related Appeals and Interferences

This application is not involved in any related appeal or interference.

(3) Status of Claims

This is a divisional application of co-pending parent application Serial No. 09/106,456 filed June 30, 1998 and entitled "Nanosize Particle Coatings Made by Thermally Spraying Solution Precursor Feedstocks," now U.S.P. 6,447,848. The claims in the parent case are claims 1-16 directed to a method of forming a film

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or coating. The claims here on appeal are claims 19-25 directed to the thin film or coated material.

(4) Status of Amendments

The sole amendment filed after final rejection is the amendment dated Dec. 19, 2002, and entitled "Second Amendment."

(5) Summary of Invention

By using the process claimed in the parent application which matured into U.S.P. 6,447,848, the coating artisan is given the capability of making thin or thick coatings which are made of nanostructured particles which have a diameter of less than 100 nm (p. 12, line 13 of the specification) and each layer is as thin as about 100 nm (p.12, line 13 of the specification). Claim 19 recites a thin film or coated material having a nanostructured material with a particle size of less than 100 nm and containing an oxide selected from the group consisting of alumina, zirconia, yttria, and mixtures thereof, which is disclosed on p. 10 in lines 7-10, and elsewhere.

(6) Issues

(i) Whether claim 23 contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to make or use the invention.

(ii) Whether claims 19-25 are unobvious under 35 U.S.C. 103(a) over the Glumac reference (U.S.P. 5,826,683).

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(7) Grouping of the Claims

All claims on appeal herein, i.e., claims 19-25, stand or fall together.

(8) Arguments

(i) With respect to the rejection of claim 23 on the first paragraph of 35 U.S.C. 112, the Examiner contends that in claim 23 it is claimed that the multilayered coating material may consist of a metal-metal, however, in claim 20, from which claim 23 depends, it stated that the coated material contains an oxide. Then the Examiner poses the final question - how can the composite be a metal when one layer contains oxides?

Claim 20 calls for a multilayer thin film or coated material having a nanostructured material with a particle size of less than 100 nm and containing an oxide selected from alumina, zirconia, yttria, and mixtures thereof. It should be noted that claim 20 is directed to a multilayer thin film or coated material and that claim 23 provides that the multilayered materials are selected from ceramics-ceramics, metal-ceramics, metal-metal and mixtures thereof. There does not appear to be any conflict between claims 20 and 21 and the subject matter of claims 20 and 21 is amply disclosed by the specification and the original claims 20 and 21. Furthermore, Applicants are amenable to any reasonable amendment of claims 21 and 23, or any other claim, to overcome this rejection.

(iv) With respect to the rejection of claims 19-25 on 35

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U.S.C.103(a) as being obvious over the Glumac reference, the Examiner contends that it would have been obvious to a person skilled in the art, on the basis of the Glumac reference, to have formed the nanophase films and multilayer coating of nanoparticles of less than 100 nm in order to take advantage of the technologically attractive properties offered by the nanoparticles. The Examiner has also concluded that on the basis of the Glumac reference, it would have been obvious to produce a multilayer noncomposite composed of conventional nanophase material, such as zirconia and alumina. In reference to claims 21-22 and 24-25 that the film is made of more than one layer and the material is graded, the Examiner contends that it would have been obvious to have formed the nanophase coating having multiple layers which are of varying compositions or to have formed a functionally graded composite on the basis of the Glumac reference which teaches that the nanophase coating may be multicomponent, multiphase, compositionally modulated or continuously graded structures.

The Glumac reference discloses nanostructured or n-materials, including nanophase powders, however, the Glumac reference does not render obvious the subject matter of claims 19-25 herein. The Glumac reference does not disclose any specific particle size of materials and the reason for this is because his deposition is from a gas and not from a solution. A nanometer particle size can be a particle of a size ranging from a fraction of a nanometer to 1000

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nanometers, leaving for the time being particles defined by, for instance, 2000 nanometers or 2 microns, and the like.

The subject matter claimed herein is unobvious over the Glumac reference since it defines the particle size in the thin film or the multilayer thin film as being less than 100 nm. A particle of 100 nm and a particle of 1000 nm are nanoparticles, however, the size difference between them is a matter not of degree but of kind and there is nothing in the Glumac reference to conclude otherwise. It should be noted that claim 22, for instance, is directed to a multilayered thin film wherein the layers are integrated by graded interfaces rather than abrupt interfaces, which is, likewise, not disclosed or rendered obvious by the Glumac reference. It is only particles of less than 100 nm that can give a smooth transition in a multilayered thin film, not particles of 1000 nm, for instance.

In the Advisory Action dated Feb. 7, 2003, it is indicated that the amendment after final rejection dated Dec. 19, 2002, and entitled "Second Amendment," would be entered for purposes for appeal and that

"Absent a teaching of the criticality of the claimed particle sizes, it does not provide a patentable distinction over the prior art."

It is requested that this application be remanded so that the issue of criticality of particle sizes can be addressed and evidence can be presented. The issue of particle size criticality has been

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raised for the first time herein.

It is petitioned to extend time for filing this Appeal Brief one month. Please charge our account #50-0281 with the 1-month extension fee of \$110.00, or whatever is appropriate.

Respectfully submitted,

George A. Kap
Reg. No. 22,898 for
John J. Karasek
Reg. No. 36,182
Navy Associate Counsel
(Intellectual Property)

Prepared by George A. Kap
Reg. No. 22,898
Tele.: (202)-404-1555

Fax Certification

I hereby certify that this document is being faxed to the PTO on the date shown below:

Feb. 26, 2003
Date

George A. Kap
George A. Kap

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(9) Appendix

The claims involved in this appeal are the following claims 19-25:

19. A thin film or coated material having a nanostructured material with a particle size of less than 100 nm and containing an oxide selected from the group consisting of alumina, zirconia, yttria, and mixtures thereof.

20. A multilayer thin film or coated material having a nanostructured material with a particle size of less than 100 nm and containing an oxide selected from the group consisting of alumina, zirconia, yttria, and mixtures thereof.

21. The multilayer thin film or coated material of Claim 20, having a nanostructure graded material and a fine scale grading, both compositionally and microstructurally.

22. The multilayered thin film or coated material of Claim 21, wherein the layers are integrated by graded interfaces rather than abrupt interfaces so as to permit the compatibility of multilayered materials.

23. The multilayered coated material according to Claim 22, wherein the multilayered materials are selected from the group consisting of ceramics-ceramics; metal-ceramics; metal-metal; organic-inorganic and mixtures thereof.

24. The multilayered coated material of Claim 21, wherein the grading is microstructural, structural and chemical with continuous

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interfaces at a fine scale.

25. The graded thin film or coated material of Claim 20 having a nanostructured graded material and fine scale grading, both compositionally and microstructurally.


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consideration by returning a signed and initialed copy of the PTO-1449 Form with the next communication from the Patent Office.

In accordance with 37 C.F.R. 1.97(e), the undersigned hereby states that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. Of course, this statement does not apply to information that has previously been cited by Applicant or the Examiner in the present application as that information is already of record and no certification is necessary.

Should there be any questions regarding the above or the present application, the Examiner is invited to contact the undersigned at the below-listed number.

Respectfully submitted,
Yoshifumi KOBAYASHI et al.


Bruce H. Bernstein
Reg. No. 29,027
3,026

October 18, 2002
GREENBLUM & BERNSTEIN, P.L.C.
1941 Roland Clarke Place
Reston, VA 20191
(703) 716-1191